US Army Medical Research and Materiel

Technology Available for Licensing

Assay for Detecting, Measuring and Monitoring the Activities and Concentrations of Proteins and Methods of Use Thereof

Features and advantages:

- **Measures sensitivity and exposure to neurotoxins by assaying AChE, BChE, or both**
- **Can assay tissues, whole or unprocessed blood, cerebro-spinal fluid, or synthetic mixtures**
- **Could screen for drug sensitivity or a disease**
- **Could determine efficacy or progress of a treatment regime**

This invention provides a rapid, precise assay and device for simultaneously detecting and measuring the activities and concentrations of two proteins having similar or overlapping properties, acetylcholinesterase (AChE) and butyryl-cholinesterase (BChE).

Cholinesterases (ChEs) are classified as either AChE or BChE according to their substrate specificity and sensitivity to selective inhibitors. AChE accelerates the hydrolysis of acetylcholine, a neurotransmitter, at nerve-nerve and neuromuscular junctions. BChE hydrolyzes and inactivates muscle relaxants such as succinylcholine and related anesthetics. About 5% of the population have an abnormal genotype for BChE. When these individuals are administered succinylcholine for inducing general anesthesia, they may experience apnea and require artificial ventilation until degradation occurs. Some chemical warfare agents, organophosphates, and pesticides exert their toxic effects by inhibiting AChE, BChE, or both. The current methods for detecting and measuring concentrations and activities of AChE and BChE have drawbacks that include wide statistical error, lack of standardization, long clinical turnaround times, and use of invasive sampling techniques.

ay may be adapted for use in a biosensor capable of detecting AChE and BChE inhibition by chemical warfare agents and pesticides.

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KEYWORDS: hand-held; cholinesterase assay; chemical warfare agents; blood; clinical; neurodegenerative disease

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